Before the
Federal Communications Commission
Washington, D.C. 20554

In the matter of	)	
	)	
Wireless E911 Location Accuracy Requirements	)	PS Docket No. 07-114
	)	
Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems	)	CC Docket No. 94-102
	)	
	)	WC Docket No. 05-196
	)	
Association of Public-Safety Communications Officials-International, Inc. Request for Declaratory Ruling	)	
	)	
	)	
911 Requirements for IP-Enabled Service Providers	)	WC Docket No. 05-196

COMMENTS FROM THE STATE OF WASHINGTON
ENHANCED 911 PROGRAM
June 22, 2007

I. INTRODUCTION

The FCC should be lauded for opening these dockets concurrently to examine the provision of location information associated with calls to 911 and, in turn, the future of E911. The discussions of location capability have clearly moved from the original intent of determining a 911 caller's location for purposes of dispatching assistance to concerns over enforcement of location standards. It also appears that there is a recognition of the importance of technology-neutral policies and hopefully an appreciation of the need for industry to respond to public safety needs. The original standards were based not on what was needed but were rather a consensus reached quickly of what may be possible with the recognized technologies available at the time. It is appropriate that a fresh look at the need for dispatch enabling location information be taken in light not only of the experience to date with wireless and the needs to service a dynamic Internet Protocol voice market, but also in light of the collaborative relationships that have developed between public safety and service suppliers. When the first Report and Order for Docket 94-102 was drafted, wireless phones accounted for les than 5% of all calls to 911.

The rest is history with Washington State now experiencing about 60% of 911 calls coming from wireless phones. Although this request for comments does not directly deal with the subject, today a tiny fraction of calls to 911 are from IP-based devices. In a few years we will see similar numbers to CMRS calls if history is a teacher. The results of this current action are directly relevant to how the impact of IP-based devices on E911 services is managed.

Today, in large part due to the Commission's pursuit of strong public safety rules, industry no longer argues that they should be excused from providing high quality 911 services and support for consumers.

Today, everyone accepts that no call to 911 should arrive at a Public Safety Answering Point (PSAP) without information that is sufficient to determine the resources necessary to reach the caller in order to render assistance. That does not necessarily mean that every call will have location information similar to traditional landline where the information indicates the caller's front door. It does mean that regardless of the device used to call 911 the information must be adequate for the PSAP to direct the assistance necessary to find and assist the caller within the bounds of the resources available. It is the criticality of the situation when combined with limited resources that makes caller location accuracy essential. It should be noted that in situations where the caller cannot verbally give location information, that inability is most frequently associated with the need for immediate assistance. Those who have a desperate need for assistance are the most likely to be reliant on the location technology of their 911 calling device and the serving carrier as the key to finding them. The expectations clearly have been established that in the minds of the consumer that when 911 is dialled their location information will automatically be sent to "911", who will send aid. The press has even noted that as Phase II is implemented 911 will be able to pinpoint the call, an expectation that is far more precise than the Phase II standards.

The State of Washington argues that the transmitted location information should simply be the best accuracy that the service provider can attain for each call within clear guidelines and expectations. The technology used to determine the location is virtually irrelevant, it must simply be the best attainable at that moment, and the location information must be dispatch enabling. In this context dispatch enabling means either a specific site address, such as is received with landline calls, or a set of common use coordinates that can be translated to a common address. The coordinate information must have three dimensions; latitude, longitude and elevation and must include a certainty factor. This latter certainty factor is key to the dispatch equation in determining resource allocations above normal response. When one is attempting to direct assistance, without a certainty factor for

each call the three dimensions are simply a guess with no value relative to the caller's actual location.

The FCC moving toward a clear indication that every device that permits a call to 911, regardless of technology used, will be expected by the Commission to provide adequate location information is a simple clear message that will meet the expectations of the consumer.

In the end, the Commission must use this Notice of Proposed Rule Making to change one central point from current practice: The obligation related to determining the 'technical and operational feasibility' of individual technologies must switch, totally and completely, from public safety to industry. Public safety is the customer on behalf of consumers. It should not be our obligation to convince industry and the Commission that a given technology is technically and operationally feasible. It is our right to expect that a 911 call coming from a consumer will have associated with it location information adequate for us to send the help needed. The consumer is object of the effort with the service supplier's efforts to forward 911 an obligation to their customer. Without this structural change from the original Order, industry has little or no financial, political, policy or business incentive to actively and aggressively invest the research and development resources into location technologies that will benefit their customer's safety. Today, industry casually waits for location technology to arrive in the market without taking an active role, constantly noting that it is not currently technically and operationally feasible. However, for their own commercial services, they invest heavily and willingly in developing new approaches to delivering new applications, forcing those services to become technically and operationally feasible quickly and efficiently. The safety of the consuming public deserves that same level of engagement, investment, enthusiasm and activity to meet our needs so we may serve consumers more successfully. In the end we should no longer be forced to support a negative; that the industry cannot deliver better accuracy location. We believe they can and should. It requires investment, focus, and accountability not to public safety but to their customers as an expected service.

II BACKGROUND

It must be remembered that the adopted Phase II accuracy requirements do not relate to actual demonstrated real needs and in fact were agreed to as a negotiated committee based consensus of what might be possible given the known technologies at the time. Little investigation was conducted into what may be possible with limited research and development investment, nor was there any belief that factors such as location based services, the relaxing of purposeful GPS signal contamination or the proliferation of alternate location

determination technologies could be included in accuracy requirements. The standards of the first Report and Order have become a benchmark that impedes doing better, and they have no per-call value. Simply, the current accuracy requirements set the bar far too low and the value to public safety of these requirements is modest at best. Industry in collaboration with public safety and the Commission can must do better. Adequate location technologies will not become technically and operationally feasible for IP-based providers and others without a clear market opportunity, demonstrated need, and useful guidelines. The market opportunity includes non-public safety utilization of location information which may become a significant driver of improved accuracy if it is made clear that the options are the services providers business not solely a directive in support of public safety.

The Commission should take into account one particular and significant value not frequently mentioned that has come with the actions associated with docket 94-102. Public Safety and the wireless industry have come together in many collaborative efforts ranging from technical development under the auspices of the National Emergency Number Association to industry reports and Best Practices as part of NRIC work groups. These relationships are ongoing with the monthly meetings of public safety and wireless representatives in Washington State but one example of long-term cooperation that has produced tremendous consumer value through improved 911 services.

III. SPECIFIC COMMENTS ON PROPOSED RULES

A. Geographic Area Required for Compliance with Section 20.18(h)

As laudable as it seems to require PSAP level accuracy reporting such reporting will be of little real value given that it will be a statistical average taken over a test period for utilization by the PSAP over a considerable length of time, two years as suggested by APCO. Achieving adequate reporting will take vast resources for the carriers to test the actual accuracy making hundred of thousands of test calls if the information is to meet even the minimal statistical standards of OET Bulletin No. 71. And the answer will only indicate an accuracy factor aimed at determining if the carrier is in compliance with accuracy standards that have virtually nothing to do with the reality of needing location information accurate enough to permit dispatch of assistance. What do the following standards mean when one is attempting to locate a violent domestic incident in an apartment complex?

- For network-based solutions: 100 meters for 67 percent of calls, 300 meters for 95 percent of calls;

- For handset-based solutions: 50 meters for 67 percent of calls, 150 meters for 95 percent of calls.

What good will knowing that the accuracy factors for a particular carrier in that PSAP's territory are within 100 meters lets say 83.7% of the time? For most of the PSAPs it will mean nothing. Nothing, unless of course the tests show that the carrier does not meet the minimum accuracy standard which will force the PSAP to demand improvement and additional testing to assure that the PSAP can not be painted as being complacent.

For PSAPs that cover a relatively large territory with both urban and rural population densities a PSAP wide accuracy evaluation will be misleading. The capabilities of location technologies in use today vary somewhat dramatically, and performance test results will reflect that variability as a single value across the PSAP territory. This will indicate a relative accuracy that is likely to result in inaccurate response dispatching if it is used to predict the needed effort to locate callers.

It also remains to be determined how enforcement will be managed by the Commission with reporting for some 6,000 PSAPs needing to be aggregated. Will enforcement also be based at the PSAP level with equal penalties for failure for PSAPs that receive 3 wireless calls per day and for those that receive hundreds of wireless calls per day? Where PSAPs permit overflow of calls to other PSAPs will enforcement be based on the data for only the first PSAP or based on the combined service area?

The accuracy standards set by the Commission for wireless 911 location were clearly engineering goals. They were a compromise agreed to without consideration of the territory in which they were to be measured. To now decide that PSAP level accuracy reporting should be the standard with the potential for additional rounds of rulings dealing with how non-compliance enforcement will be levied will have no benefit to the caller or to the PSAP who is charged with dispatching assistance.

The original intent of the actions states took in requesting that the Commission intervene to assure that location information is delivered when calls were made to 911 from wireless services did not specify technology or even establish a standard for accuracy compliance. The single intent was to have information for every 911 call that was useful to permit dispatch of resources. Tremendous efforts were undertaken by both carriers and PSAPs to achieve that goal with considerable success. But we are still missing two critical elements, the indication of probable accuracy for each individual call and the third dimension, elevation. PSAP level testing to determine compliance with Phase II accuracy standards will not achieve the original goal or even forward it. PSAP level compliance requirements do have the

potential of firmly establishing the engineering goals done nearly 10 years ago as the final answer with all future investments aimed at only conforming to the testing standards. It will create information that PSAPs will need to go to great lengths to utilize that is by design an average and not related to a specific call. As with Phase II implementation it should be expected that PSAPs will certify that they are ready to receive and utilize the accuracy information before the CMRS provider would need to begin testing for that PSAP.

An additional concern is that many carriers have made the decision to integrate 911 compliance into their business operations units even to the point of self recovering the costs associated with delivering 911 location information. This has meant that state imposed fees and taxes could be concentrated on assuring that their 911 systems are adequate. For many wireless carriers this has resulted in ceasing to request 911 cost recoveries from taxes or fees. The additional costs associated with providing PSAP level compliance testing will have nothing to do with overall carrier business models and it should be anticipated that the carriers will expect reimbursement for those costs where states have provided for carrier cost recovery. If this occurs it will exacerbate the current situation where carriers are typically ready to provide Phase II information in areas where the PSAPs are not requesting it due in part to insufficient funds. The result may well be a slowing of Phase II implementation and an inability to upgrade PSAP call management capabilities where Phase II is already deployed.

PSAP level Phase II compliance reporting will at best provide information that is marginally relevant. It is more likely to end up being detrimental to the original goals of providing information on each 911 call that will enhance the ability to dispatch assistance by focusing resources toward compliance testing of an engineering goal that has never been relevant to actual need. Additionally a calculated accuracy value for a PSAPs coverage area ignores the dynamic nature of wireless networks where these networks are constantly evolving in physical location of radio sites, software capability, and with dynamic self managed capacity reconfiguration.

As an alternative the Commission should consider moving from providing for compliance management through standards with associated enforcement to requiring per call accuracy information delivery. This does not mean calculating an accuracy factor for the PSAP coverage territory based on a testing program, but rather utilization of advanced signal analysis to determine the likely accuracy for each call. A per call calculated accuracy both provides needed information and eliminates the discussion of territory size.

Other Wireless E911 and VoIP 911 Accuracy Issues

B.8 Deferred Enforcement of Section 20.18(h)

PSAP level compliance reporting will be a significant task. In areas where PSAPs cover small territories obtaining statistically relevant data will require a similar number of calls as that done for PSAPs that cover large territories. The Commission should before considering enforcement clearly define the expected level of statistical relevance for test calls with that becoming the basis for estimating the time required to complete the first testing cycles.

It may also be relevant to consider as one of the requirements to be met prior to any enforcement the PSAP capability to utilize the data. To date little work has been done on development of software tools that would permit the use of statistical test data in real-time dispatch decisions. Until PSAPs are fully able to utilize the compliance information compliance enforcement would seem to be inappropriate.

Wireless telecommunications services are clearly a competitive market. Rather than taking the regulatory step of enforcement the Commission may be better served by taking a more market based approach of assuring that carrier capabilities to provide meaningful 911 location information becomes a readily available tool for customer evaluation when making product choices. To date the public perception of 911 location capability has been noted as being achieved when Phase II is implemented with no data made available to groups that make it their business to assist the consumer in making meaningful choices. In many cases such as the ability of a vehicle to protect occupants in offset crashes the group has established rating criteria that have become accepted as standards, with successful ratings often included in vehicle advertising materials. A common belief is that wireless services are purchased solely on the basis of price, however if that were true it is unlikely that wireless handsets would have built in cameras or capabilities for internet access. Prices are clearly competitive and consumer information ratings generally emphasize other items such as a carrier's connectivity performance at least equal to price in determining overall value. Rather than delve into the complexities of an enforcement program the Commission should simply assure that true 911 location performance data is readily available. In addition to moving the compliance from a regulatory process to a competitive market process this would open the door for recognition that location capability for 911 calls can be far more precise than that required under the FCC rules with a business case incentive for carriers to provide the best possible location information.

B.9 Single Location Accuracy Standard

Washington State believes that the location accuracy levels should be simple, clear and technology neutral to enable public safety to respond to 911 calls without wasting critical time attempting to analyze the capability of different technologies employed by various service providers. It should not be relevant to a PSAP whether operator A uses technology type N to in supplying location information, only that the information delivered meet a set of standards for transmission that leads to a per-call accuracy calculation. The service delivery method of a type of call (CMRS, IP, hybrid) should not be the regulatory framework that defines expected results. This is critically important when the blending of technologies within one network is considered since both the call delivery mechanism and the location determination technology could change between calls from the same service supplier, and even between calls made by the same mobile device.

Ideally, there should be a single accuracy goal. It should apply to any and all devices that can call 911 and it should not attempt to define the technology utilized. No person in the 911 call chain from the caller to the responders should need to make adjustments due to more than one standard for accuracy information.

B.10 Handset versus Network Based Requirements

The difference was initiated only as a modification of the original compromise in order to give the handset based carriers time to replace handsets. It exists because of the recognition by carriers that they could be far better than the original standard if they were given time to implement. The Commission should not only define a single accuracy goal but should coordinate with other countries who are also working to define goals for location information from wireless devices in emergencies. The United States is not the dominant market for wireless technologies and it is not logical that carriers will be able to acquire handsets or network components at a reasonable price if there are multiple goals. How the location is determined should not be a concern of the Commission, only that it be the best that can be attained for every call. That goal is shared by emergency services worldwide and having the Commission at the table internationally at every opportunity would forward the availability of technologies for location determination.

B. 11. Location Technologies

We are aware of a growing number of vendors and providers working to deliver higher quality location accuracy. Location Technologies have improved dramatically in the last 10 years. Manufacturers have noted at

Commission hearings that the Global Positioning System (GPS) capabilities in handsets are now integrated into the circuitry. That would have been unthinkable before the 94-102 requirements. GPS itself is being improved and agreements are in place to have its capabilities collaborate with those of Galileo as that location determination system is put into service. Buildings are increasingly being equipped with signal retransmitted systems to permit indoor location utilizing GPS or to simply improve the accuracy.

Other technologies such as the utilization of FM broadcast signals have been demonstrated along with other systems that use RFID type chips in a network. These are not being developed for 911 but for commercial applications that require very accurate location determination. They could be available for 911 and Commission actions should encourage location determination development for 911 accuracy without bias for how it is done. One vendor, S5Wireless, Inc., of Salt Lake City, Utah has appears to employ a hybrid approach that would enable considerable accuracy in three dimensions and has been reported to have conducted tests of the technology on operational 911 networks.

Washington State maintains that the Commission should initiate investigations into the promulgating of extremely accurate location technologies that may be used for 911, but which will have significant commercial applications, knowing that the commercial applications will add to the robustness of these systems for use in public safety applications including 911 caller location. It is our belief that the Commission can and should use its authorities to encourage active research and development investment by making the goals for location information delivery clear, simple and consistently technology neutral so that the marketplace will evolve with continuing improvements in location accuracy.

B.12. Accuracy Standard

Location accuracy should be in all instances the best that can be delivered with a clear indication in the information associated with a 911 call of the probable accuracy obtained for that individual call. Considerable effort was put into determining appropriate 911 call accuracy requirements by a National Emergency Number Association workgroup during discussions of appropriate model legislation for MultiLine Telephone System compliance with E911. It was clear that the standard for purposes of dispatching assistance to a residential unit is the address. Discussions of other situations such as schools and businesses centered not on the acknowledged need for location information that is equivalent to a residential unit address but rather how to achieve that level of accuracy. The ideal address information is that which permits the responders to go directly to the person

in need without delays caused by needing to search an area. If an area must be searched the address information should give the dispatch personnel at the PSAP some indication of how much additional resource is needed to complete the search in time to be of meaningful assistance.

In typical wireless 911 call situations it is necessary to convert the coordinates to an address to which responders can be directed. Using the address as the ideal information is useful since there is a lower limit to the parameters that define what constitutes an address. Apartments are seldom smaller than 200 square feet or about 20' by 20'. Assuming that the caller was within the center 2/3 of that area and results in an ideal diameter of about 4 meters. In the third dimension this would generally also be adequate to define the floor a person is on and would differentiate between direction of travel for most urban freeways. The effort can be extended to determining the percentage of time a 911 caller is likely to be away from a common wall in larger multi-family residences to standard cubicle sizes in office complexes as an interesting exercise, but is likely that as an ideal parameter location accuracy within 4 meters would seldom fail to permit conversion to a useful address for purposes of dispatching assistance.

Setting this as a goal, that is within a 4 meter diameter area in three dimensions, would give system designers a parameter to attempt to achieve that is useful as they look ahead to implementing location technologies that may be useful for locating 911 callers. There is ample opportunity in the product development and deployment process for innovators to implement highly accurate location determination capabilities if the Commission would set an ideal goal, and without the Commission setting arbitrary standards. That being said it should be made clear by the Commission that the actual performance of systems is information that cannot be held from consumer scrutiny.

It is also suggested that the Commission take a leadership role in the development of 911 network standards that will permit nationwide ubiquitous 911 information flow with common element definitions. To do so will forward both the ability of public safety to utilize the information non-discriminately and the ability of innovators to design effective solutions. This would also free up the innovators to work on accurate location capabilities knowing that their efforts would not be lost in an inability for PSAPs to transfer information to other PSAPs where mutual aid may be the responding units.

B.13. Compliance Timeframes.

The timeframes for compliance for the proposed enforcement should be reasonable for the amount of testing needed to be accomplished. This will be a factor of the complexity of the testing to a large degree as determined by

the degree of statistical accuracy being mandated. If a testing cycle of two years is mandated the implementation timeframe could also be two years to permit CMRS planning to support long term cyclical testing.

As in Phase II implementation PSAPs would need to certify that they are ready to receive the information and that they are able to utilize it. Testing at the PSAP level would be essentially a fruitless exercise toward the stated goals of the Commission if the PSAP is not ready to utilize the information.

Again, the compliance timeframe issue becomes of no significance if per-call accuracy information becomes the standard. In this case it would be appropriate to request that any carrier committing to development and implementation of per call accuracy reporting propose a schedule for their efforts and be held to that schedule including public posting of progress.

B.14. Compliance Testing

Office of Engineering Technology Bulletin 71 is clearly a guide with multiple variables that must be decided on an as appropriate basis. For it to be useful in the context of PSAP level testing it should be enhanced with some clear guidelines related to the circumstances of the PSAP. Many PSAPs receive less than ten 911 calls per day but they may have multiple CMRS radio sites which could generate a significant testing effort. 911 calls to that PSAP are equally important to those answered by a PSAP that gets hundreds of wireless calls per day. However, statistical relevance for the lower call volumes can be prescribed by the Commission where the number of calls necessary to achieve a statistical standard would far exceed the number of calls the carrier would normally process to the PSAP.

It is possible that a single site may serve two or more PSAPs and this should also be accommodated by additional directions within OET Bulletin 71. Testing sites at or near the border of PSAPs should in many circumstances be useable data for both PSAPs. Procedures should be included to permit such testing.

B.15. Schedule for Testing.

Any schedule for mandated testing where the results will be utilized until the next testing schedule is a compromise over per call real-time information. That said, APCO's proposal of testing every two years must have been done with forethought on the necessity of meeting PSAP needs and it is suggested that APCO be requested to supply their reasoning to support any schedule adopted by the Commission.

B.16. Accuracy Data

As previously noted every call to 911 should contain an indication of the probable accuracy of the information being delivered. This should not be a figure based on some calculated average done every two years. Signal analysis techniques should be combined with known attributes of the serving networks to provide real-time accuracy information. This is particularly important as networks become more dynamic with self configuring software that can adjust the network to meet variable loads. This is also important to consider where wireless networks are migrating to seamless call handoff between the wireless network and WiFi hotspots. The ability to provide the actual address of the hotspot has been demonstrated and would be far superior for dispatch purposes, but may be precluded by required adherence to the Phase II standards.

B.17. 911 Calls Placed When Roaming

Carriers that have roaming agreements should be expected to consider 911 location capabilities when implementing the technologies to permit roaming of each other's subscribers. True roaming is a service condition that can be anticipated and 911 capability engineered into the networks.

An associated roaming issue is the requirements for non-initialized phones to be permitted access to 911. The non-initialized requirements are automatically invoked when a phone has not been initialized, even on the subscriber's network when 911 is dialled immediately after the phone is turned on. This generally results in the 911 call being processed with none of the location information that would otherwise be available if the caller had waited long enough to have the phone initialize. This appears in testing to be a roaming issue but should not be so characterized since it is an unanticipated undesirable side effect of the Commission's requirements for service provision to process 911 calls from non-initialized handsets. It does result in degraded 911 capabilities and can be very detrimental when the handset also locks into a 911 mode that prevents its utilization to receive calls from the PSAP or to perform other functions. When discussing roaming issues in a 911 context the Commission should take steps to assure that there is a clear delineation between dealing with true roaming and forced roaming calls that otherwise would be managed by the subscriber’s network. The testing procedure in OET Bulletin 71 calls for handsets to be turned on immediately prior to making the test calls which will in many cases result in a roaming condition.

This 911 dialling before set initialization has become a consumer safety issue that thwarts the efforts carriers have put into implementation of Phase II

location delivery in their systems. Following the OET Bulletin 71 process will bias the test results even though it may mimic consumer practice. It may be appropriate for the Commission, Public Safety and the CMRS carriers to collaborate on consumer education to increase the awareness that subscribers should wait for the phone to initialize before dialling 911.

B.18. Interconnected VoIP Services

The accuracy goal for all services that permit dialling 911 should be the same, the best possible for each call.

This is particularly true for interconnected VoIP where there is a potential for accuracy that would be far superior the current Phase II standards. The Commission should take great care to avoid situations where standard imposition restricts achieving superior location information delivery. This will be the case where a CMRS carrier interconnecting to a VoIP service can provide an actual street address for the caller, which the CMRS provider is be permitted to deliver to the PSAP either directly because of the standard or indirectly because those calls cannot be calculated into the enforcement equations.

B.19 Commission Reports

The Commission should begin an aggressive investigation of technologies associated with caller location. Associated with this investigation the Commission should openly solicit suggestions on location techniques that utilize cooperative use signalling with an intent to catalyze implementation of these systems if there is adequate carrier interest. Such systems would have clear advantages in multiple location determination signal paths while creating an equipment market that should minimize the implementation costs. If all carriers broadcast a common usage location signal from all radio sites it is likely that amazing accuracy could be obtained.

Systems that broadcast location information for mobile units to interpret are the basis of GPS and the similar orbital systems. These systems provide for a commonly utilized capability for territorial level regeneration, or complimentary, signals to improve the accuracy. The Commission should sponsor vendor neutral discussions on the future of GPS and potential commercial applications for it to determine the viability of there technologies for use in the areas where today it location determination with GPS is difficult. This includes work with the public safety community and building code officials on the utilization of GPS enhancements to support land mobile public safety radios where it has value both in rural and urban settings.

IV. CONSLUSION

Washington State is not encouraged by the prospect of enforcement actions for what are now clearly inadequate standards for 911 caller location accuracy. Enforcement of PSAP level average accuracy reporting does not appear to be relevant to the original goal of acquiring the best possible information concerning the caller's likely location for every call to 911 from a mobile device. The efforts at implementing a significant ongoing program of regular testing and compliance review would be better aimed at setting clear goals that encourage research and development into and actual implementation of technologies that will permit a per call reporting that results in information that is truly useful in performing the objective of dispatching assistance to the caller.

The convergence of technologies utilized for call management blurs many of the past assumptions concerning 911 both for call delivery and for location information. The timing of this Notice of Proposed Rule Making is ideal, coming when the existing location technologies are mature, new technologies are being tested, call delivery technologies are merging, and public safety is fully engaged in the development of next generation 911 networks.

Respectfully submitted

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